

What is claimed is:

1. An implant for insertion between a first vertebra and a second vertebra, the first vertebra having a first cortical bone plate and the second vertebra having a second cortical bone plate, characterized in that the implant comprises:

a first terminal part defining a first bearing surface to bear against the first cortical bone plate, a second bearing surface opposite said first surface to bear against the second cortical bone plate, said first surface being separated from said second surface by a first distance;

- a second terminal part opposite said first terminal part, said second terminal part defining a third bearing surface to bear against the first cortical bone plate and a fourth bearing surface opposite said third surface to bear against the second cortical bone plate, said third surface being separated from said fourth surface by a second distance greater than said first distance to restore a spinal curvature; and

- an elongated central part defining a first projection transversely extending past said first surface and said third surface, and a second projection transversely extending past said second surface and said fourth surface, said first and second projections being configured to pass through the first and second cortical bone plates when said first and third surfaces bear against the first cortical bone plate and said second and fourth surfaces bear against the second cortical bone plate.

2. The implant of claim 1, wherein said central part defines a cavity for receiving bone graft material.

3. The implant of claims 1 or 2, wherein said central part includes a pair of longitudinal walls defining said first and second projections.

4. The implant of any of claims 1-3, wherein said central part includes a pair of walls each having a generally trapezoidal contour.

5. The implant of any of claims 1-4, wherein:
said first terminal part includes a first flange defining said first surface and a
second flange defining said second surface; and
said second terminal part includes a third flange defining said third surface and
5 a fourth flange defining said fourth surface.
6. The implant of any of claims 1-5, wherein said first, second, third, and fourth
surfaces are generally flat.
- 10 7. An implant for insertion between a first vertebra and a second vertebra, the first
vertebra having a first cortical bone plate and the second vertebra having a second
cortical bone plate, characterized in that the implant comprises:
a first terminal part defining a first bearing surface to bear against the first
cortical bone plate, a second bearing surface opposite said first surface to bear against
15 the second cortical bone plate;
a second terminal part opposite said first terminal part, said second terminal
part defining a third bearing surface to bear against the first cortical bone plate and a
fourth bearing surface opposite said third surface to bear against the second cortical
bone plate; and
20 an elongated central part including a pair of longitudinal walls defining a cavity,
said walls defining a first edge projecting past said first and third surfaces and a second
edge projecting past said second and fourth surfaces, said first and second edges being
configured to correspondingly penetrate the first and second cortical bone plates when
said first and third surfaces bear against the first cortical bone plate and said second
25 and fourth surfaces bear against the second cortical bone plate.
8. The implant of claim 7, wherein said first and second edges are tapered.
9. The implant of claim 7 or 8, wherein said walls each have a generally
30 trapezoidal contour.

10. The implant of any of claims 7-9, wherein:

said first terminal part includes a first flange defining said first surface and a second flange defining said second surface; and

5 said second terminal part includes a third flange defining said third surface and a fourth flange defining said fourth surface.

11. The implant of any of claims 7-10, wherein said first, second, third, and fourth surfaces are generally flat.

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12. The implant of any of claims 7-11, wherein said cavity holds bone graft material.

13. The implant of any of claims 7-12, wherein at least a portion of the implant is
15 composed of a porous material.

14. The implant of any of claims 7-13, wherein said first and second surfaces are separated by a first distance and said third and fourth surfaces are separated by a second distance greater than said first distance to accommodate a spinal curvature.

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15. A tool for insertion between a first vertebra with a first cortical bone plate and a second vertebra with a second cortical bone plate, characterized in that the tool comprises:

a proximal handle connected to an elongate shaft configured to rotate
25 about a longitudinal axis of the tool;

a first non-cutting portion adjacent said handle, said shaft extending through said first non-cutting portion and being configured to rotate relative thereto;

a cutting portion fixed to said shaft to rotate therewith, said cutting
30 portion being positioned distal to said first non-cutting portion, said cutting

portion including a first pair of generally parallel opposing faces and a second pair of opposing faces each extending between said first pair of faces, said second pair of faces each defining a number of teeth;

a second non-cutting portion fixed to said cutting portion, said second
5 non-cutting portion defining a distal head; and

wherein said first non-cutting portion, said cutting portion, and said second non-cutting portion have a rotatably selectable alignment to present a generally constant height dimension, the height dimension corresponding to the intersomatic space defined between the first and second cortical bone plates to
10 facilitate insertion of the tool therein, said cutting portion being rotatable out of said alignment to cut a first opening into the first cortical bone plate and a second opening into the second cortical bone plate while inserted therebetween.

16. The tool of claim 15, wherein said first non-cutting portion includes a pair
15 of stops configured to correspondingly bear against the first and second vertebrae to limit the extent of insertion of the tool between the first and second vertebrae.

17. The tool of claim 15 or 16, wherein said second non-cutting portion has another dimension generally equal to a desired intervertebral space dimension
20 and greater than said height dimension.

18. The tool of any of claims 15-17, wherein said cutting portion has a generally trapezoidal contour.

19. A method of spinal fusion, comprising:

(a) cutting a first vertebra and a second vertebra with a tool positioned therebetween; and

(b) inserting the implant of any of claims 1-14 between the first and second
5 vertebrae after said cutting.

20. A method of spinal fusion, comprising:

(a) cutting a first vertebra and a second vertebra with the tool of any of claims 15-18; and

10 (b) inserting an implant between the first and second vertebrae after said cutting.

21. The method of claim 20, wherein the implant is any one of the implants of claims 1-14.

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22. A method of spinal fusion, comprising:

(a) cutting a first opening into a first cortical bone plate of a first vertebra and a second opening into a second cortical bone plate of a second vertebra with a tool inserted therebetween, the tool including:

20 a proximal handle connected to an elongate shaft configured to rotate about a longitudinal axis of the tool;

a first non-cutting portion, the shaft extending through the first non-cutting portion and being configured to rotate relative thereto;

25 a cutting portion fixed to the shaft to rotate therewith, the cutting portion being positioned distal to the first non-cutting portion, the cutting portion including a first pair of generally parallel opposing faces and a second pair of opposing faces each extending between the first pair of faces, the second pair of faces each defining a number of cutting teeth;

30 a second non-cutting portion fixed to the cutting portion, the second non-cutting portion defining a distal head; and

(b) inserting an implant between the first and vertebrae after said cutting, the implant penetrating the first and second openings.

23. The method of claim 22, wherein:

5 the implant includes a first terminal part defining a first bearing surface and a second bearing surface opposite the first surface, the first surface being separated from the second surface by a first distance; a second terminal part opposite the first terminal part, the second terminal part defining a third bearing surface and a fourth bearing surface opposite the third surface, the third surface being
10 separated from the fourth surface by a second distance greater than the first distance; and an elongated central part defining a first projection extending past the first surface and the third surface, and a second projection extending past the second surface and the fourth surface; and

said inserting includes correspondingly passing the first and second
15 projections through the first and second openings; bearing against the first cortical bone plate with the first and third surfaces; and bearing against the second cortical bone plate with the second and fourth surfaces.

24. The method of claim 22, wherein:

20 the implant includes a first terminal part defining a first bearing surface and a second bearing surface opposite the first surface; a second terminal part opposite the first terminal part, the second terminal part defining a third bearing surface and a fourth bearing surface opposite the third surface; and an elongated central part including a pair of longitudinal walls defining a cavity for holding a bone
25 graft material, the walls having a first edge transversely projecting past the first and third surfaces and a second edge transversely projecting past the second and fourth surfaces; and

said inserting includes correspondingly passing the first and second edges through the first and second openings; bearing against the first cortical bone plate

with the first and third surfaces; and bearing against the second cortical bone plate with the second and fourth surfaces.

25. The method of any of claims 19-24, further comprising performing a
5 discectomy.

26. The method of any of claims 19-25, further comprising inserting a distractor between the first and second vertebrae before said cutting.

10 27. The method of any of claims 19-26, wherein said cutting includes:
initially inserting the tool so that the first pair of faces are each in contact with a
respective one of the first and second cortical bone plates;
turning the handle to rotate the cutting portion; and
withdrawing the tool from between the first and second vertebrae.

15 28. The method of any of claims 19-27, wherein said inserting the implant includes:
positioning the implant between the first and second vertebrae; and
turning the implant about one quarter of a turn after said positioning.

20 29. The method of any of claims 19-28, further comprising implanting another
implant.

30. The method of any of claims 22-24, providing bone graft material with the
implant.